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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/419,347	10/15/1999	LEE J. BURROWS	CALT-2806-CIP1	1097

7590 05/19/2003

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EXAMINER

HITESHEW, FELISA CARLA

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 05/19/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/419,347

Applicant(s)

Burrows, et al

Examiner

Hiteshew

Group Art Unit

1715

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

## Period for Response

A SHORTENED STATUTORY PERIOD FOR RESPONSE IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a response be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for response is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to respond within the set or extended period for response will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

## Status

- ☒ Responsive to communication(s) filed on September 4, 2002.
- ☐ This action is **FINAL**.
- ☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

## Disposition of Claims

- ☒ Claim(s) ~~14-22~~ 14-22, 36-44 and 59 is/are pending in the application.
- ☐ Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- ☒ Claim(s) ~~14-21, 36-40 and 59~~ is/are rejected.
- ☒ Claim(s) 22 and 41-44 is/are objected to.
- ☐ Claim(s) \_\_\_\_\_ are subject to restriction or election requirement.

## Application Papers

- ☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.
- ☐ The proposed drawing correction, filed on \_\_\_\_\_ is ☐ approved ☐ disapproved.
- ☐ The drawing(s) filed on \_\_\_\_\_ is/are objected to by the Examiner.
- ☐ The specification is objected to by the Examiner.
- ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. § 119 (a)-(d)

- ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).
  - ☐ All ☐ Some\* ☐ None of the CERTIFIED copies of the priority documents have been received.
  - ☐ received in Application No. (Series Code/Serial Number) \_\_\_\_\_.
  - ☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\*Certified copies not received: \_\_\_\_\_

## Attachment(s)

- ☒ Information Disclosure Statement(s), PTO-1449, Paper No(s) 9
- ☐ Interview Summary, PTO-413
- ☐ Notice of References Cited, PTO-892
- ☐ Notice of Informal Patent Application, PTO-152
- ☒ Notice of Draftsperson's Patent Drawing Review, PTO-948
- ☐ Other \_\_\_\_\_

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### SPECIFICATION

The disclosure is objected to because of the following informalities: The examiner request that the application nos. for the U.S. related patent applications be submitted on page 1, line 19 and line 22. Appropriate correction is required.

### DRAWINGS

The drawings are objected to because margin, character lines and shading informalities. Please review PTOL form 948. Correction is required.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to

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consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

### 103 REJECTION

Claims 14-21, 36-40 and 59 rejected under 35 U.S.C. 103(a) as being unpatentable over Chen, et al.

Chen, et al teaches a process for forming a thin-film waveguide in LiNbO<sub>3</sub> and LiTaO<sub>3</sub> crystals, comprising a Li<sub>2</sub>O-rich guiding layer, in which both TE and TM polarizations are optimized by suppression of Li<sub>2</sub>O out-diffusion and promotion of Li<sub>2</sub>O in-diffusion. This process includes annealing the sample of LiNbO<sub>3</sub> or LiTaO<sub>3</sub> in a high purity powder of LiNbO<sub>3</sub> or LiTaO<sub>3</sub>. The invention also teaches two separate processes respectively by which the out-diffusion of Li<sub>2</sub>O from LiNbO<sub>3</sub> and LiTaO<sub>3</sub> waveguides is suppressed. In one embodiment, the sample of LiNbO<sub>3</sub> and LiTaO<sub>3</sub> is annealed in molten LiNO<sub>3</sub> and Li<sub>2</sub>O out-diffusion is suppressed, while in another process embodiment, the sample is annealed in a high purity powder of LiNbO<sub>3</sub> or LiTaO<sub>3</sub> and Li<sub>2</sub>O out-diffusion is eliminated. Li<sub>2</sub>O can be satisfactorily diffused into LiNbO<sub>3</sub> and LiTaO<sub>2</sub> crystals for optical fabrication purposes, which is believed to be a hitherto unknown fact. At high temperatures, the loosely bound Li<sub>2</sub>O molecules tend to escape from the surface of the LiNbO<sub>3</sub> or LiTaO<sub>3</sub> crystal structure, as previously discussed. In accordance with the present invention, the wafer is exposed to a Li<sub>2</sub>O-rich environment such that out-diffusion of Li<sub>2</sub>O from the wafer is suppressed and the compensation process of diffusion Li<sub>2</sub>O back into the wafer becomes thermodynamically favorable. The source of the Li<sub>2</sub>O-rich environment is a high purity powder of LiNbO<sub>3</sub> or LiTaO<sub>3</sub>.

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The suppression of the Li<sub>2</sub>O out-diffusion from LiNbO<sub>3</sub> and LiTaO<sub>3</sub> waveguide structures in accordance with the present invention prevents the formation of unwanted waveguide modes and the associated problem of excessive cross-talk between guides modes. Thus, it facilitates waveguide switching and modulation. Further, it enables efficient end-butt coupling between a single mode optical fiber and a channel waveguide to be achieved. (See column 3, lines 10-64)

The difference being that Chen, et al does not teach the method, as stated supra, wherein cooling the substrate from a maximum anneal temperature at a rate of about 20°C per minute takes place or wherein said pressurizing is within a pressure range of about 1 psi above ambient atmosphere pressure to about 25 psi above ambient atmosphere pressure. However, in the absence of unobvious results, it would have been obvious to one of ordinary skill in the art to modify and optimize the process parameter limitations, as taught by Chen, et al, in order to ensure proper orientation. The motivation being that out-diffusion of Li<sub>2</sub>O from LiNbO<sub>3</sub> and LiTaO<sub>3</sub> waveguide structures can be suppress to eliminate undesirable waveguide modes produced.

#### ALLOWABLE SUBJECT MATTER

Claims 22 and 41-44 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Felisa Hiteshew whose telephone number is 703-308-

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2545. The examiner can normally be reached on Monday, Tuesday and Thursday from 5:30 a.m. to 4:00 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech, can be reached on (703) 308-3836. The fax phone number for the organization where this application or proceeding is assigned is 703-308-3599.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

F.H.

A handwritten signature in black ink, appearing to read "F.H. Utech", written in a cursive style.